

CROP TALK

Volume 8, Issue 2 | OMAFRA Field Crop Specialists — Your Crop Info Source | June, 2008

Table of Contents

Brought to You by the Following OMAFRA Crop Specialists

Mike Cowbrough Weed Management Program Lead
Hugh Martin, Organic Crop Production Program Lead
Horst Bohner, Soybean Specialist
Ian McDonald, Applied Research Co-ordinator
Albert Tenuta, Field Crop Pathologist
Keith Reid, Soil Fertility Specialist
Jack Kyle, Grazier Specialist
Brian Hall, Alternative Production Systems Specialist
Peter Johnson, Cereals Specialist
Scott Banks, Emerging Crops Specialist
Gilles Quesnel, Field Crops, IPM Program Lead
Christine Brown, Nutrient Management Program Lead
Adam Hayes, Soil Management Specialist - Field Crops
Greg Stewart, Corn Industry Program Lead
Tracey Baute, Entomology, Field Crops Program Lead

Editor: *Joel Bagg, Forage Specialist*
Compiled by: Marian Desjardine, OMAFRA, London

More than Scouting from the Windshield

by Gilles Quesnel, Field Crop Integrated Pest Management Specialist, OMAFRA, Kemptville

To assess crop establishment, plant growth and/or pest pressure, a simple windshield observation or drive-by will not do. While you want to keep field scouting as simple as possible, each field needs to be walked through individually.

Basic tools for field scouting includes: a clipboard for recording information, a pocket knife to dig or slice specimens, plastic bags to collect specimens, a hand lens, a measuring tape, and a hula-hoop for population counts. When scouting, look for things that will affect yields, such as plant population, emergence, soil compaction, crusting, diseases, insects, weed escapes, herbicide injury etc.

Your field scouting pattern must be representative of the entire area. When scouting, take into account changes in variety or hybrid, soil type, past cropping history, fertilizer/ manure application and any other factors that can affect plant growth.

To calculate plant population in row crops, count the number of plants in 1/1000 of an acre and then multiply the count by 1000 to obtain the number of plants per acre. Table 1 below lists the row length equal to 1/1000 of an acre at various row widths.

Ministry of Agriculture, Food and Rural Affairs
Ontario

Table 1

What's 1/1000 of an acre	
Row Width In Centimetre (inches)	**Length of Row Equal to 1/1000 Acre**
38.0 cm (15")	10.62 m (34 ft., 10 in.)
50.8 cm (20")	7.97 m (26 ft., 2 in.)
76.2 cm (30")	**5.33 m (17 ft., 5 in.)**
81.3 cm (32")	4.98 m (16 ft., 3 in)
91.4 cm (36")	4.42 m (14 ft., 6 in.)

To determine plant population and pest infestation levels in narrow row crops, a sampling frame with a known area can be placed on the ground for the counts. This is done using a square frame (e.g. 50 cm x 50 cm equal 0.25 m^2) or a circular frame (e.g. a Hula-hoop). The Hula-hoop method is displayed in Table 2. Using the Hula-hoop, determine the number of plants per acre by counting the number of plants found inside the hoop and multiplying that number by the predetermined factor for the diameter of your hoop, which is listed in Table 2.

Table 2

Diameter of Hoop in Centimetres (inches)	Factor by Which to Multiply the Number of Plants Within the Hoop to Equal the Number of Plants per Acre
91 cm (36")	6,221
84 cm (33")	7,301
76 cm (30")	8,925
69 cm (27")	10,820
61 cm (24")	13,852

Regardless of the method used to determine plant population and pest infestation levels, at least 10 random counts should be taken in each field to determine an average.

The starting point for diagnosing problems is to look for patterns. Look for areas where the problem occurs and where it is absent.

- Crop problems that are consistent with the topography or the soil type of the field are more likely to be soil related than caused by pests or field operations.
- Problems which are worse on one side or edge of the field are likely to be related to spray drift or to the movement of insects into the field from one side.
- Problems, which occur on isolated plants throughout a field, may be related to diseases such as root rots.
- Problem areas within a field, which have sharply defined boundaries or appear in strips, are often related to field operations. Nematodes, however, are relatively immobile so the edge of a nematode-infested spot may also be very distinct.
- Problems that are concentrated in one row but do not appear in an adjacent row are usually equipment or starter fertilizer related. The distance between affected rows will provide some insight into the width of the piece of equipment involved. At times, crop patterns may also relate to old field boundaries which could be up to ten years old or more.

More from the Land, Rather Than More Land!

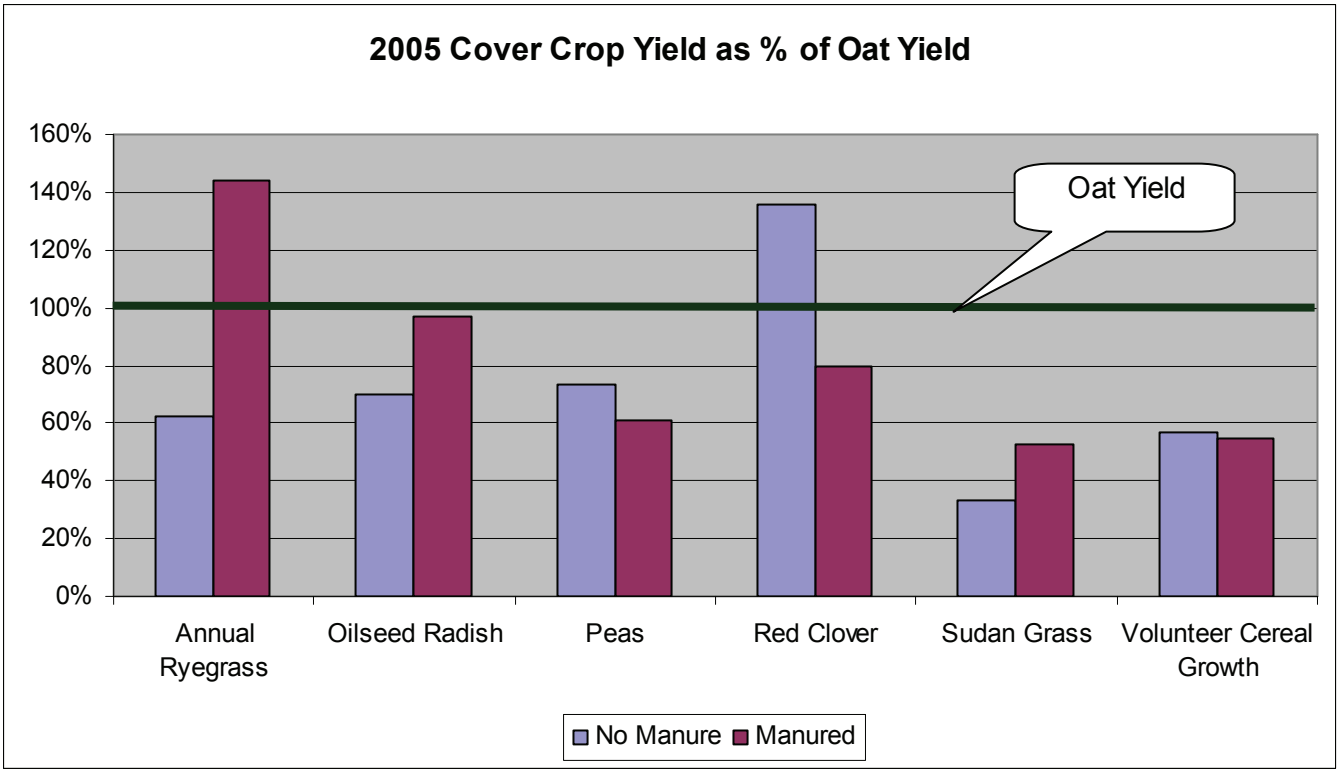
by Scott Banks, Emerging Crop Specialist and Nancy Noecker, Cow-Calf Specialist, OMAFRA

With the renewed optimism in corn, soybeans, wheat and other cash crops, there is more pressure on each acre of land to produce. The additional acres of corn, soybeans and wheat mean there is less hay and pasture ground. Double cropping after a cereal crop using a cover crop such as oats is an opportunity to grow additional forage for your livestock. Research has shown that oats seeded after winter wheat harvest can yield 1 to 3.5 tonne per acre where manure was applied. Even in fields without manure, oats can yield 0.5 to 1.5 tonne per acre for forage. At hay prices of $85.00 plus per tonne, cover crops can give a good return in addition to the cereal crop harvested.

Using Cover Crops As Forage

Farmers have used a variety of species, including barley, mixed grain, oats, rye and turnip-cereal mix, peas & triticale. Figure 1 summarizes the result of a study which compared oats, oilseed radish, peas, red clover, annual ryegrass and sudangrass as cover crops. Only red clover with no manure and annual ryegrass with manure produced more forage than oats. Volunteer winter cereals yield only 50 to 75% of the oat forage yield. In another study where cover crops followed spring wheat, the volunteer spring wheat yielded about the same as many of the cover crops. In this study, cover crop yields were 0.5 to 1 tonne per acre. In

Figure 1: 2005 Cover Crop Study Which Compared Oats, Oilseed Radish, Peas, Red Clover, Annual Ryegrass And Sudan Grass



both studies, the highest forage yields where from annual ryegrass with an application of manure.

Establishing A Cover Crop

It may seem early to be talking about August seeding, but now is the time to start planning. Establishing a cover crop can be done using a no-till drill, or by broadcasting the seed followed by a light tillage pass (such as a cultivator or rotary harrow) to incorporate the seed. Ideally seed should be planted at 35 mm (1.5 inches) depth. Some tillage can reduce disease pressure from the preceding cereal crop. Under dry conditions, following with a packer will firm the seed to soil and help retain moisture for better emergence. Manure can be applied before planting. Incorporation will capture more of the readily available nitrogen in the manure.

Grazing

Harvesting the cover crop using strip grazing with cattle or sheep is more efficient than cutting and baling. Cereal crops are usually ready to begin grazing about 45 to 60 days after planting. They should be grazed before the head-stage of the cereals as forage quality will then begin to decline rapidly.

Does late fall/winter grazing compact the soil? Research from Nebraska with beef cattle showed that winter grazing crop residues had no significant effect on the following year grain crop yield and additional tillage was not required. However, spring grazing increased the bulk density of the soil, and decreased water infiltration rate. Therefore cattle should not graze crop residues after the soil has thawed in the spring.

Photo 1 - Cattle strip grazing triticale / forage peas and forage turnips.

Benefits

There are several benefits to using cover crops following a cereal crop:

- provides soil protection from wind and heavy rains in the fall months before freeze up,
- builds soil organic matter,
- the livestock improves nutrient cycling,
- with legumes such as red clover, nitrogen can be fixed for the following crop, and
- it provides the livestock farmer a place to spread manure in the late summer and reduces the nitrogen that could be lost to the environment.

The direct benefit to the livestock farmer is the extra feed produced as he gets more from the land, rather than using more land!

Breaking Through the Soybean Yield Plateau

by Horst Bohner, Soybean Specialist, OMAFRA

Average farm yields of soybeans in Ontario have been stagnant over the past two decades. Although soybean genetics continue to improve, this genetic gain is not being realized in enough fields. The reasons for the slow gain in field yields are complex, but higher commodity prices have provided greater economic incentive to find solutions to these mediocre yields. Yield contest winners in the US of over 150 bu/ac, have also reminded us that the yield potential of soybeans is at least 3 times higher than what we typically see in the field.

Ontario farmers, researchers, and extension specialists are working to find solutions to improve soybean yields. Current agronomic recommendations are based on research with relatively narrow objectives that focus on simple effects of a few factors at a time. A list of average yield gains from separate experiments conducted in Ontario is listed in Table 1. This illustrates just a few of the management strategies that have been utilized to increase yield.

Now that soybean prices are higher, it is time to consider managing more intensively. A current initiative to assess the economics of intensively managed soybeans is made up of three parts:

1. University of Guelph small plot research to test the additive effects of various inputs and management strategies,
2. Replicated producer field length strip trials to assess the economics on a larger scale,
3. Ontario Soybean Growers (OSG) yield contest to learn from high yielding producers.

OSG Yield Contest

2008 marks the first year for the Soybean Yield Challenge, sponsored by the OSG. To compete in the challenge, the soybean field size must be a minimum of 10 acres and the harvested plot must be a minimum of 1.5 acres of that same field. All soybean production practices will be permitted. Either conventional or genetically modified seed is eligible, but all seed must be certified. Growers will be required to fill out a survey form stating production practices of the competition field,

Table #1: Average Yield Gains from Various Inputs in Ontario

	Average Yield Gain (bu/ac)	Percentage of Trials with Statistically Positive Result
Corn/Soy/Wheat Rotation compared to poor rotation	4.2	86
Early-May planting date compared to late-May	3.8	79
Pre-tillage compared to no-till	1.8	67
Insecticide/Fungicide Seed Treatments	1.9	17
Foliar Fungicides in the absence of disease	2.2	30
Foliar Fertilizer Feeding (excluding Mn deficient fields)	1.5	18

location of field and general weather data. Deadline to enter is June 15, 2008. A $10 entry fee per variety is required. Competition areas will be divided into three provincial zones based on maturity groups; Zone 1 - 2700 HU and under; Zone 2 – 2725 to 3000 HU; and Zone 3 – 3025 HU and above.

The highest yielding field in each zone garners a cash prize of $10 per bushel of yield and a Yield Challenge jacket. Prizes for the second highest yielding field in each zone includes tickets to farm equipment shows and a Yield Challenge jacket. Each entrant will receive a stylish Yield Challenge hat.

To enter the Soybean Yield Challenge, contact the Ontario Soybean Growers 519-767-1744 or www.soybean.on.ca.

With this collaborative three-pronged approach, significant progress can be made toward finding more effective recommendations for improving soybean yields over the next few years.

Fertilizing Pastures

by Jack Kyle, Provincial Grazier Specialist, OMAFRA

As I write this, it is late-May. The temperature is having a hard time getting up to what is referred to as “seasonal”. This backward type of weather makes for slow plant growth and very little pasture available for the grazing livestock. What options do you have to stimulate the grass to grow? Heat is the first requirement and that one you can’t do anything about. The other consideration is fertilizer application.

Can You Manage More Grass?
With warm weather there will be rapid grass growth that will need to be managed. Do you have the number of livestock and the fencing that will allow you to manage this growth? If you can rotate livestock from pasture to pasture, then you have the main requirement for taking the best advantage of the grass growth and optimizing its use.

Legumes Provide Nitrogen
If the pasture has greater than 35% legume in it, there will likely be adequate nitrogen produced by the legumes to meet the requirements of the grasses. When estimating the amount of legume, keep in mind that there needs to be an even distribution of the legumes across the pastures. Legume plants are often more visible than the grass plants in the stand. As producers, we often overestimate the amount of legume present. Take a careful look and even harvest a small square sample. Separate the grasses and the legumes to see how much of each are actually present.

Nitrogen Application - Rate & Timing
Grass responds very well to nitrogen fertilization, provided there is a reasonable level of phosphorous and potassium available in the soil. You will see a response to nitrogen about 2 weeks after application, and this increased growth will carry on for about 5-6 weeks.

To get an economic response to nitrogen, a minimum of 40 lbs per acre of actual nitrogen should be applied. Because of the high solubility of nitrogen, a maximum application rate of 75 lbs per acre is suggested. If you have a very productive pasture that you want to put on more nitrogen, then increase the number of applications.

Timing of application will depend on a number of factors, but mid-June will generally give the optimum results. By mid-June, the lush spring growth will have slowed and the nitrogen will give the grass another boost. Once we are into July the risk of not getting enough rainfall to take the nitrogen into the root zone is a concern. The other consideration is that grass growth may slow in the heat of the summer, especially if there is a shortage of moisture.

Expensive Fertilizer and The Cost of Making Hay

by Joel Bagg, Forage Specialist, OMAFRA, Lindsay

As the fertilizer bills are coming in, many of us are suffering from sticker shock. Not too long ago it would have been a stretch to imagine $650 urea, $1,200 MAP and $600 muriate of potash. Livestock producers producing their own forage and using manure to manage their fertility will be much less impacted than those cash cropping grain and hay. How will high commercial fertilizer costs and increased commodity and land prices affect forage production?

P and K Removal

Forage crops have high nutrient requirements. With a mixed alfalfa-grass stand, the value of the phosphorous and potassium removed is currently about **2.1¢ / lb** (or $46 / tonne) of dry hay harvested. Grasses contain a little less P and K, so about **1.8¢ / lb** ($40 / tonne) are removed. As an example, assuming a mixed stand with a modest yield of 3.2 tonnes (3.5 tons) per year, hay will remove about 57 lbs of P_20_5 and 206 lbs of K_2O, with a value of $147/acre (assuming P_20_5 @ $1.05/lb and K_20 @ $0.46/lb).

Without manure or commercial fertilizer, the soil test will drop quickly. Assuming that it takes about 35 lbs/ac of P_20_5 and 20 lbs/ac of K_20 to move the soil tests by 1 ppm on some soils, after only 4 years the P_20_5 soil test could drop by 7 ppm and the K_20 by 41 ppm. This is commonly referred to as "soil mining", and is not sustainable.

With the increase in fertilizer prices, you may question whether you can afford this expense, but the short and long term costs of poor fertility is much higher than the cost of the fertilizer.

Impacts On Pricing Standing Hay

Historically, standing hay has often been a good buy. With higher corn, soybean and wheat prices, we are seeing higher hay prices in the market. Land rental rates have increased, and there is competition for acreage from these other crops. If you consider an opportunity cost for land rental, P and K removal, and an amortized establishment cost, that historic 1 - 2¢ / lb of standing hay is way under the mark today.

For example, as a starting point for negotiations, what would be a possible value for a field of standing hay yielding 3.2 tonne/ac (3.5 ton/ac), that could rent as bare land for $175/ac? This pencils out to about 2.1¢ for P and K removal, plus 2.5 ¢ / lb land rental, plus about 0.7 ¢ / lb in amortized establishment costs, for a total of about **5.3¢ / lb**. Even an old grassy field yielding only 2.5 tonnes/ac (2.75 tons/ac) grown on land that might rent for $50/ac, without any amortized establishment costs (because it is so old), might be worth about **2.7¢ / lb** (1.8¢ P and K removal plus 0.9¢/lb land rental value).

Livestock still needs to be fed. Will, and more importantly, can the market pay these kinds of prices? I don't know, but if it doesn't there may be a lot of hay acres move to other crops.

N Value of Alfalfa Plowdown

When penciling the value of growing the various crops, don't forget to consider the nitrogen value when alfalfa is plowed down. A stand that is one-half or more legume contributes about 110 kg N/ha (100 lb/ac). At current nitrogen values, this is equivalent to about $63/ac. Stands that are only one-third to one-half legume get a N credit of about 55 kg/ha (49 lb/ac), for a value of $31. Research also shows that in addition to the nitrogen credit, there is a yield benefit of alfalfa plowdown to corn of about 10 - 15%.

Soil Sample

With higher fertilizer prices, you may want to target your fertilizer applications more strategically than in the past. Take soil samples after first-cut to guide fertilizer applications later in the summer. If the K soil test of the field is below 150 ppm, you can expect a response to adding potassium. In addition, low P and K fertility will reduce the longevity of the stand substantially. Consider top-dressing fields with commercial fertilizer or manure following one of the cuts during the summer.

Manure Getting More Respect

As fertilizer prices keep going up, manure is getting more and more respect! Maintaining fertility is much easier and less expensive for forage producers when manure is available. The best option because of the highest economic return from the nitrogen is still to spring apply manure to corn crops in the rotation. However, there are some advantages to applying manure to forage, including potential yield benefits, spreading the workload, reducing manure storage requirements, preventing soil compaction, and reducing environmental risk.

Higher hay, land and input costs means we need to do the best we can in growing, harvesting and storing our forage crops to maximize yield and quality, and minimize losses. Refer to "Pricing Standing Hay" and "Manure Application To Forages - An Economical Alternative" on the OMAFRA Forage Website at www.omafra.gov.on.ca/english/crops/field/forages.html.

N Rates Compared by Corn Producers in 2007

Greg Stewart, Corn Industry Program Lead, OMAFRA and Ken Janovicek, University of Guelph

Background

Last year 35 producers from across Ontario tested N rates on their corn fields in order to evaluate new OMAFRA recommendations compared to more traditional N rates. The plan for this project was pretty simple. Use the N calculator to determine the recommended nitrogen rate for a producer's specific corn field. Contrast that against what the producer has typically used as an N rate to grow corn. Set up plots and/or sections within the fields to grow corn using both of the aforementioned rates. Soil texture, soil fertility levels (including soil N tests), GPS site mapping of the field, yields and harvest moistures for most fields were obtained over the 2007 growing season. The results allowed us to compare the impact of the various N rates on the yield, the nitrogen costs and the net impact of following the calculator on each field.

2007 Results

The results from last year highlighted the potential risks and benefits of fine tuning nitrogen rates. In 2006, 12 producers in the Southwest estimated their expected yield to be 148 bu/ac; however, the actual yield from these fields using the grower N rate was 190 bu/ac! The 2007 yields, in the Southwest sites were more in line with the expected yields producers entered into the calculator.

Table 1 indicates that on average, if producers applied 50 lbs more N than the Calculator recommended yields increased only slightly on average. Perhaps a better way of assessing the results is based on the number of producers that came ahead economically by following the calculator. In the Southwest 9 of the 13 participating producers did so. Variability on heavier soils is still an issue that we continue to sort out. The calculator does recommend more N on heavier soils (29 lbs/acre more on clay than on silt loams, for example) but on occasion the results still have the calculator scratching, especially if yields are higher than expected.

In the Central sites (roughly from London to Guelph) the calculator recommendations did very well (see Table 2). 10 of the 12 sites showed improved net returns by applying the calculator rate. Interestingly, the silt loam/loam sites where the calculator gives the lowest recommendation (compared to other soil types) seems to be very

Table 1. Southwest Region Nitrogen Rate Comparison Results for 2007

N Calculator Recommendation Strips		Grower Recommendation Strips	
Average N Rate (lb/ac)	Average Yield (bu/ac)	Average N Rate (lb/ac)	Average Yield (bu/ac)
114	145	165	148
Number of Sites where the N Calculator Recommendation resulted in greater net profitability		Number of Sites where the Grower Recommendation resulted in greater net profitability	
9		4	

Table 2. Central Region Nitrogen Rate Comparison Results for 2007

N Calculator Recommendation Strips		Grower Recommendation Strips	
Average N Rate (lb/ac)	Average Yield (bu/ac)	Average N Rate (lb/ac)	Average Yield (bu/ac)
113	146	138	143
Number of Sites where the N Calculator Recommendation resulted in greater net profitability.		Number of Sites where the Grower Recommendation resulted in greater net profitability	
10		2	

reliable. Questions have arisen over the red clover credit. The calculator gives a 73 lb credit for red clover that is plowed. This is based on data where the stands of red clover would be considered good, that is uniform and at least 12" (30 cm) at seasons end. Based on results from the last two years this credit is too large for spotty stands or stands with poor fall growth.

In Eastern Sites (Ottawa Valley) the N calculator, with an average recommendation of 98 lbs N per acre, faired better than the producers rate only half the time (see Table 3). We continue to gather data to verify the original conclusion taken from research done in this area. This is, that the region needs significantly less fertilizer N, all other things being equal, than the rest of the province. The 2007 results show quite high yields with relatively modest N applications, but does not support the Calculator as being more reliable than producer estimates. One complicating factor is that over both years the actual yields have been considerably higher than expected. Additional field testing will aim to improve recommendations in the east.

Where Now?

This specific project is concluded. However, if you would like further information regarding N rates for corn, or to see what the calculator recommends for your fields, please go to www.gocorn.net.

One criticism occasionally made of general nitrogen recommendations is that a uniform N rate is recommended over fields which will have variable requirements. Are there significant advantages to using variable rate N recommendations across a field? The research information has been quite unclear as to the possibilities, and it is difficult to actually verify that the variable rate was a net improvement over uniform rates.

It is possible to obtain variable rate information from the Calculator N in regards to changes in either soil texture or yield. If you attempt to do this, care should be taken to ensure that N rate adjustments above or below the field average rate are done only in sections of fields with a known stable history of producing yields that are significantly below or above the field average. For example, if a sandy knoll almost always produces yields that average 75 bu/ac below the rest of the field which is a loam, then recommendations would suggest that N rates on the sandy knoll may be reduced by 40 lb-N/ac when compared to the rest of the field.

Future development and refinement of N recommendations for corn will focus on how reliably variable N rate recommendations can be predicted using the current Calculator N recommendations but apply them in a site specific pattern.

Acknowledgements

Appreciation is expressed to the following sponsors of this project: the Ontario Corn Producers Association, the Agricultural Adaptation Council (CORD IV), AGRICORP, and the Ontario Ministry of Agriculture, Food and Rural Affairs. Appreciation is expressed to all of the farm co-operators.

Table 3. Eastern Region Nitrogen Rate Comparison Results for 2007

N Calculator Recommendation Strips		Grower Recommendation Strips	
Average N Rate (lb/ac)	Average Yield (bu/ac)	Average N Rate (lb/ac)	Average Yield (bu/ac)
98	187	135	193
Number of Sites where the N Calculator Recommendation resulted in greater net profitability.		Number of Sites where the Grower Recommendation resulted in greater net profitability	
5		5	

The Transition to Grow Organically?

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

Once you decide to seriously look at organic production, one of the challenges is what to do first. I suggest going slow and doing your research.

The first stage of transition to organic is to look closely at yourself and your abilities. Why do you want to do this? What do you need to learn? What crops or livestock would you want to grow? What would be the issues to produce them organically? In many cases, yields will drop during the transition and then increase for several years. Once fully organic, yields may still be lower but prices for certified organic products are higher. You will need to factor in slightly more labour and more tractor time. For most crops, the cost of production for organic is very similar to conventional production. However, this varies with the crop or livestock species.

Do Your Homework

Now is a good time to develop organic information. Attend field days in your area and talk to other organic farmers to observe their successes and challenges. Most fertilizer and pest control inputs that are used in conventional production cannot be used in organic. In some cases there are alternative products for fertility and pest management. There must be a greater reliance on planning to avoid or minimize the problems by changing the production system of crop rotations, tillage, planting timing, resistant varieties, biological pest controls, etc. There must be a greater reliance on a multiple-pronged integrated approach to problem solving.

Investigate potential organic markets. Organic markets can operate much differently than their non-organic counterparts. In many cases, marketing organic products will take more time. Larger buyers require you to be certified organic. In the future, CFIA will require all organic food products sold out of the province or imported into the province to be certified according to the new Canada Organic Products regulations.

Organic Certification

The Canadian Organic Standards must be applied to the production area for 36 months prior to harvest of the organic crops. Only substances and inputs as specified by the Standards can be used during the transition and for certified organic production. Farms must apply for Organic Certification annually, beginning in the year prior to production of the certified organic products. In other words, you need to apply in 2008 (so they can inspect the 2008 crop while it is growing) for transitional status on land that you plan to certify for organic in 2009.

You can start with part of your farm and gradually transition the whole farm. Start with your best and most looked at field to manage and observe the transition. Cereals and forages are often the best crops to reduce costs and risk during the transition.

Resources

There are numerous resources available on the internet and from various associations.

Ecological Farmers Association of Ontario – www.efao.ca

Canadian Organic Growers – www.cog.ca

OMAFRA - www.omafra.gov.on.ca/english/crops/organic/organic.html.

ON Organic

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

OMAFRA has a new newsletter – "*ON Organic*". As the title suggests it discusses Organic issues that are relevant to the Ontario organic sector. This includes production, processing, marketing, certification, etc. *ON Organic* will be available monthly by e-mail and also on the OMAFRA website.

You can find "*ON Organic*" at: www.omafra.gov.on.ca/english/crops/organic/news/news-organic.html.

You can subscribe to this newsletter by going to the webpage: www.omafra.gov.on.ca/english/subscribe/index.html#organic

For example here is the Table of Contents from the May 2008 issue