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CURRENT NEWS AND UPDATES

Early or Late? While there are a lot of different opinions on what type of a spring we will have in 2014, one thing that is certain is that the DEKALB® Brand will have the right hybrids and varieties for your farm no matter what Mother Nature delivers. Our lineup of products has never been as deep with solid agronomics and top end yield potential at every maturity. This year, our research program will address new agronomic challenges and continue to develop technologies that will hopefully be on your farm in the near future. Emerging challenges to Canadian growers include: glyphosate resistant weeds, insects, and a growing excitement around precision agriculture. We're happy to be working on products that will potentially provide solutions and recommendations for all of these challenges.

As we move through the last months of winter and start to think more seriously about planting season, we encourage you to reach out to our trusted retail network and DEKALB Brand staff to answer any last minute questions about your corn or soybean crop for 2014. The winter months are a great time to listen to new ideas and research findings that may or may not work for your farm. We are happy to help you sift through them and find what fits for your operation.

Thanks for making us a part of your plans for success in 2014.

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For additional agronomic information, please contact your DEKALB® Brand Seed Agronomist.

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Seed Treatment Options for Corn

Early season temperatures can be unpredictable and may sometimes cause seed to sit in the ground longer than planned during germination, which can cause seedlings to become prone to infection. The potential effects of this stress can be reduced using seed treatment products for disease and insect protection. One or more of the following conditions may benefit from the use of seed treatments: early planting, reduced tillage, poorly drained or high clay content soils, and fields with tight crop rotations or a history of disease.

Seed Treatments offered with corn seed vary among brands. Brand of corn product determines seed treatment offering and can make a difference in insect disease control. Check with your seed dealer to determine which seed treatment is available for the seed you purchase. By law, Fluency Agent must be used as a seed flow lubricant in place of talc and graphite when planting neonicotinoid treated seed (regardless of seed or treatment brand). If talc or graphite has not previously been a part of regular planting practices, Fluency Agent is not required.

Seed Treatment Options	Active Ingredients	Major Pests
Acceleron® Seed Treatment Technology for Corn (Monsanto Canada Inc.)	ipconazole (fungicide) metalaxyl (fungicide) trifloxystrobin (fungicide) clothianidin (insecticide)	*Fusarium, Rhizoctonia, Pythium* black cutworm (suppression), grape colaspis, seed corn maggot, white grub, wireworm
Acceleron® Seed Treatment Technology for Corn (Monsanto Canada Inc.) + PONCHO®/VOTiVO™ (Bayer)	ipconazole (fungicide) metalaxyl (fungicide) trifloxystrobin (fungicide) clothianidin *+ Bacillus firmus* I-1582	*Fusarium, Rhizoctonia, Pythium* black cutworm, grape colaspis, seed corn maggot, white grub, wireworm, sugarcane beetle Nematodes: dagger, lance, needle, pin, ring, root knot, root lesion, spiral, sting, stubby root, stunt
Pioneer Premium Seed Treatment Products for Corn (PPST 250)	azoxystrobin (fungicide) fludioxonil (fungicide) mefenoxam (fungicide) thiabendazole (fungicide) thiamethoxam (insecticide)	*Fusarium, Rhizoctonia, Pythium* black cutworm, grape colaspis, seedcorn beetle, seedcorn maggot, white grub, wireworm
Cruiser Extreme® (Syngenta)	azoxystrobin (fungicide) fludioxonil (fungicide) metalaxyl (fungicide) thiamethoxam (insecticide)	*Fusarium, Rhizoctonia, Pythium* black cutworm, grape colaspis, seedcorn beetle, seedcorn maggot, white grub, wireworm
Apron XL® LS (Syngenta)	metalaxyl-M and S-isomer (fungicide)	*Pythium*
Dynasty® 100FS (Syngenta)	azoxystrobin (fungicide)	*Rhizoctonia, Pythium*
Maxim® Quattro (Syngenta)	metalaxyl-M and S-isomer fludioxonil azoxystrobin thiabendazole	*Pythium, Rhizoctonia, Fusarium, Aspergillus, Penicillium*

Acceleron® seed treatment technology for corn (fungicides and insecticide) is a combination of four separate individually-registered products, which together contain the active ingredients metalaxyl, trifloxystrobin, ipconazole, and clothianidin. Acceleron® seed treatment technology for corn with Poncho®/VoTivo™ (fungicides, insecticide and nematicide) is a combination of five separate individually-registered products, which together contain the active ingredients metalaxyl, trifloxystrobin, ipconazole, clothianidin and Bacillus firmus strain I-5821.

The Right Planting Date—Based on Soil or Calendar?

Early planting generally sets the stage for maximum yield potential. Soil temperatures should ideally be 50° F and 77° F (10° C and 25° C) for corn and soybean germination, respectively. However, soybean seed can germinate at temperatures as low as 50° F (10° C).[1] Therefore, growers and researchers are examining yield potential of earlier planting dates for corn and soybean.

Corn

The optimum corn planting date in southwestern Ontario is typically on or before May 7th and in central and eastern Ontario on or before May 10th.[2] With the shortness of the optimum period, risk of spring weather delays, and the improvements in corn seed products, growers have tried planting before the optimum time frame. Each spring is different, and the primary considerations for corn planting should be soil temperature, field conditions, and crop insurance policy dates.
Soil temperatures can hover around 50° F (10° C) in late April and early May. Temperature fluctuations early in the planting season can lead to uneven seedling germination.

Soybean

Most Ontario soybean growers typically grow soybeans adapted to the relative maturity of their area and they plant in the typical date range (May 6 to May 20th). A collaborative three-year study (2010 through 2012) with Monsanto Canada's Technology Development Team in Ontario and Quebec, OMAFRA, and the University of Guelph examined how planting date and variety maturity interacted. Conclusions from the study were:

- Soybean crops planted early have shown significant yield increase over those planted late – and have not shown any yield decrease on average, when compared to the normal planting dates used in the trial.
- To implement early planting dates, a seed treatment that combines both an insecticide and a fungicide should be used.
- To help maximize yield potential when planting early, growers should use a variety that matures 200 CHUs later than a regular soybean variety. For example, if a typical variety for the region requires 2800 CHU and the grower is planting two weeks earlier, a 3000 CHU variety should be considered.
- 'Long-season' varieties planted in the 'early window' matured only 0.5 days later than 'adapted' varieties planted in the normal window of planting and did not delay wheat planting.
- Over the three years, a significant increase of 4.1 bu/ac was demonstrated by simply shifting the planting date two weeks earlier, and at the same time using a 0.8 MG (200 CHU) longer variety.

Sources: [1]Pedersen, P. 2008. Soybean planting date can have a significant impact on yield. Iowa State University. [2]OMAFRA Staff. 2009. Pub 811: Agronomy Guide. Corn: Planting.

Planting Rate Recommendations for Corn and Soybean

The recommended rates at which corn and soybean should be planted may vary by the field production capability, row width, soil characteristics, and seeding date. The delicate balance in finding the correct seeding rate involves seeding at a rate high enough for your specific field to reach maximum production, while not spending money on excess seed that may not be necessary.

Corn. The common corn population grown in Ontario has ranged from 64,000-74,000 plants/ha (26,000- 30,000 plants/acre). While use of these traditional populations has provided good yields over a wide range of growing conditions,

Table 1. Corn seed spacing for various populations.

Final plants/ha	Final plants/acre	Row Width: cm (in.)						
		38 (15)	51 (20)	56 (22)	71 (28)	76 (30)	91 (36)	97 (38)
		Distance between in-row corn plants in cm (in.)						
54,300	22,000	48 (19.0)	36 (14.3)	33 (13.0)	26 (10.2)	24 (9.5)	20 (7.9)	19 (7.5)
59,300	24,000	44 (17.4)	33 (13.1)	30 (11.9)	24 (9.3)	22 (8.7)	18 (7.2)	18 (6.9)
64,200	26,000	41 (16.1)	31 (12.1)	28 (11.0)	22 (8.6)	20 (8.1)	17 (6.7)	16 (6.4)
69,200	28,000	38 (14.9)	29 (11.2)	26 (10.2)	20 (8.0)	19 (7.5)	16 (6.2)	15 (5.9)
74,100	30,000	35 (13.9)	27 (10.5)	24 (9.5)	19 (7.5)	18 (7.0)	15 (5.8)	14 (5.5)
79,000	32,000	33 (13.1)	25 (9.8)	23 (8.9)	18 (7.0)	17 (6.6)	14 (5.4)	13 (5.2)
84,000	34,000	31 (12.3)	23 (9.2)	21 (8.4)	17 (6.6)	16 (6.1)	13 (5.1)	12 (4.9)

Source: OMAFRA. 2009. Pub 811: Agronomy guide for field crops. http://omafra.gov.on.ca (verified 2/13/2014).

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recently developed hybrids have been shown to tolerate higher plant densities resulting in higher yield responses.

Optimum populations of some recent hybrids range from 74,000-86,000 plants/ha (30,000-35,000 plants/acre). Corn seed spacing for various desired population levels can be found in Table 1. Since seed does not all emerge due to germination percentage and environmental conditions, seeding must be done at a slightly higher rate than the desired stand. When planting is done into cold soils or completed early in the season, a seeding rate that is 10% higher than the desired final stand should be used. An increase of only 5% should be sufficient for warmer soils.

Table 2. Recommended Soybean Seeding Rates

Seeds/ Kilogram	Seeds/ Pound	Row Width cm (in.)			
		19 (7.5)	38 (15)	56 (22)	76 (30)
		Seeds/hectare (seeds/acre)			
		480,000 (194,000)	437,000 (177,000)	425,000 (172,000)	400,000 (162,000)
		Number of Seeds/m of row (per ft of row)			
		9 (2.8)	17 (5.1)	24 (7.2)	30 (9.3)
		Seeding Rate kg/ha (lb/acre)[1]			
4,400	2,000	109 (97)	99 (89)	98 (86)	91 (81)
4,900	2,200	98 (88)	89 (80)	88 (79)	82 (74)
5,300	2,400	91 (81)	82 (74)	82 (72)	76 (68)
5,700	2,600	84 (75)	77 (68)	76 (66)	70 (63)
6,200	2,800	77 (69)	70 (63)	70 (62)	65 (58)
6,600	3,000	73 (65)	66 (59)	65 (58)	61 (54)
7,100	3,200	68 (61)	62 (55)	61 (54)	57 (51)
7,500	3,400	64 (57)	58 (52)	58 (51)	53 (48)

[1] These seeding rates are based on having a germination of 90% and an emergence of 85%-90% (plant stand of 76%-81% of seeding rate).

Source: OMAFRA. 2009. Pub 811: Agronomy guide for field crops. http://omafra.gov.on.ca (verified 2/13/2014).

Soybean crops can provide good yield over a range of seeding rates due to their ability to compensate for stand differences. Seeding at too high of a rate, however, adds unnecessary costs and can lead to problems with diseases and lodging. Because of the potential differences in seed size, soybean seed should be planted based on seeds/ha (seeds/acre) not the kg/ha or lb/acre. In most soils, there is no advantage to seeding at a rate higher than 494,000 seeds/ha (200,000 seeds/acre).

The seeding rates recommended for soybean are shown in Table 2. In general, wider rows require lower seeding rates. Higher rates (10%) may be needed for heavy clay soils, lower germination or vigour rating, or late planting. A slight reduction can be used when using precision planting as opposed to a seed drill. In general, full yield potential can be achieved in Ontario at final plant stands of 309,000-370,000 plants/ha (125,000-150,000 plants/acre), depending on row width.

Sources: OMAFRA Staff. 2009. Pub 811: Agronomy Guide. Corn: Planting and Soybeans: Planting and Crop Development.

Technology Development Research Corner: The Roundup Ready® Xtend Crop System

The Roundup Ready Xtend Crop System combines a dicamba tolerant trait with the proven yield performance of the Genuity® Roundup Ready 2 Yield® platform in soybeans. With herbicide tolerance to both dicamba and glyphosate, farmers will have the option to utilize multiple modes of action for enhanced weed control in soybeans. This technology will be one of the industry's first biotech stacks in soybeans, and is an exciting new chapter in Monsanto's soybean strategy to deliver higher yield potential. The Technology Development (TD) Team has been working hard to demonstrate the advantages of this new technology, and to develop a full set of application guidelines to help farmers and applicators use the system correctly. The Roundup Ready Xtend Crop System is anticipated for commercial launch in 2015. The Canadian TD team has been working with the Roundup Ready Xtend Crop System for six years (2008-2013), and has focused its research efforts on the following objectives:

- Demonstrating the yield benefit of early season, residual weed control with the addition of dicamba compared to the standard 2-pass Roundup Ready® system
- Soybean tolerance to glyphosate and dicamba for regulatory approval
- Control of tough weed species and glyphosate-resistant weeds
- Development of new dicamba formulations

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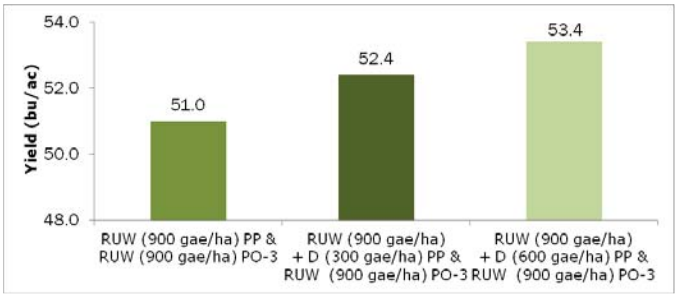

Figure 1. Source: Monsanto TD field trials – Eastern and Western Canada (n=34)
RUW=Roundup WeatherMAX®; D=dicamba; PP=preplant/ preemergence; PO-3=post application at V3-V4 soybean growth stage

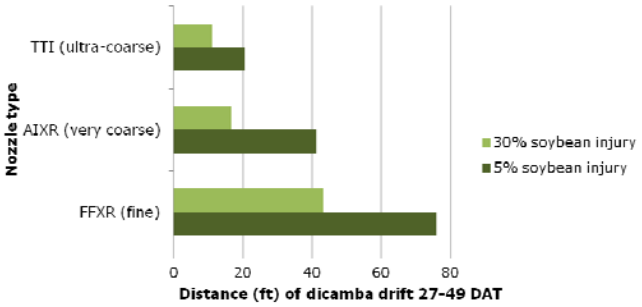

Figure 2. Source: Monsanto TD field trials – Eastern Canada (n=9)
Note: wind speeds were 10-15 km/h

- Best management practices such as nozzle selection and tank cleanout to maximize the benefits of the system

Here are a few research highlights to date:

- The addition of dicamba with Roundup WeatherMAX® applied preplant or preemergence at 0.5L/ac provides residual weed control, and reduces early season competition during the critical weed free window.
- Early season weed control with dicamba provides a 2.4 bu/ac yield advantage over a 2-pass Roundup WeatherMAX system on average over six years of research at 34 locations (Figure 1).
- Nozzle selection is an important decision that will help to minimize drift of glyphosate and dicamba on sensitive species.
- Nozzles that produce very coarse to ultra coarse droplets will minimize drift, and will not compromise weed control while increasing the likelihood of on target applications (Figure 2). Turbo TeeJet® Induction (TTI) nozzles reduced dicamba drift up to 74% compared to flat fan nozzles that produce fine droplets (Figure 2).

The TD team will continue to work on various projects in 2014 that support the Roundup Ready Xtend Crop System. If you have any questions, please do not hesitate to contact your local Monsanto representative.

Commercialization is dependent on multiple factors, including successful conclusion of the regulatory process in key export markets, and the registration of new soybean varieties in Canada. **The information presented herein is provided for educational purposes only, and is not and shall not be construed as an offer to sell until all necessary regulatory obligations are met.**

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