



Genuity™ Roundup Ready 2 Yield™ Soybeans – Where Does the Added Yield Come From?

Ken Currah – Market Development Agronomist, PRIDE Seeds



“Yield does not arrive the day of harvest.” This was quoted by Fred Sinclair, Product Manager for AgReliant Genetics, back in early July as we exchanged emails commenting on the outstanding appearance of the new PRIDE FX2 Genuity™ Roundup Ready 2 Yield™ Soybeans. A simple enough statement, but we really need to dissect the 2009 growing season to understand all the primary factors that contribute to yield, and more specifically to the increased yield potential of Genuity™ Roundup Ready 2 Yield™ genetics.

The foundation of the Genuity™ Roundup Ready 2 Yield™ concept is the improved gene insertion process, resulting in a plant capable of better withstanding the many stresses of the typical growing season. Simply put, the soybean plant is able to protect more of its yield potential from Mother Nature's many attempts to take bushels out of our bins, and put them in hers.

The 2009 season started with numerous stresses on soybean plants, and will end that way as well. It's quite a list:

- Planting into soils that were cooler and wetter than desired, resulting in slow germination and exposure to early season seedling diseases
- Heavy residue from the 2008 crop, combined with a lack of fall tillage and wet fall conditions in general, made for a suspect growing medium in some cases
- The resulting stands, in many cases at lower populations than intended, were then subject to cooler than average conditions in June and July, during the vegetative growth stages
- When seasonal temperatures finally arrived in August, soybean stands in many areas were also subject to heavy rainfall from the storms that accompanied the warm, humid conditions, resulting in lush growth during the late vegetative stages
- These conditions led to disease pressures such as white mould, phytophthora and other root and stem roots

Upon examining how the new Genuity™ Roundup Ready 2 Yield™ genetics were able to better tolerate these adverse conditions, we are able to determine the benefits of the new technology package. Right from the seedling stage, PRIDE FX2 Soybeans with Genuity™ Roundup Ready 2 Yield™ Technology – a package that includes CruiserMaxx® Beans seed treatment and HiStick® N/T inoculant – outperformed first-generation Roundup Ready® soybeans by achieving better plant stands and more even plant growth (See photo below).



Throughout these early season stresses, Genuity™ Roundup Ready 2 Yield™ Soybeans were consistently the best-looking and most even fields, and as the plants approached reproductive stages, we were excited about the yield contribution this improved plant health would provide.

Research tells us that Genuity™ Roundup Ready 2 Yield™ soybeans are proven to produce more 3 and 4 bean pods, resulting in an average of 5 extra beans per plant, which in turn generates a documented 7% -11% increase in yield. With approximately 4 - 6 weeks to go before harvest, and soybeans in the late reproductive stages, the PRIDE Seeds' Team set out to determine the yield potential of the new technology versus the previous standard.

We established a method where we compare a PRIDE Genuity™ Roundup Ready 2 Yield™ soybean variety against a key Roundup Ready first generation competitor. We randomly take 5 – 10 plants from the same field/plot, with the only prerequisite being that the plants be pulled from areas of even growth and even population. We then remove and count the number of pods containing 1, 2, 3, and 4 beans, how many “new” pods were still developing but small enough that we were unable to determine how many beans would develop in that pod. From there we are able to determine how many beans are present and assumed to contribute to yield, and also an idea of how much more pod-set potential the plant could realize (see photo below)



From the above compare we determined the following:

Comparison		Description		Beans/Pod Counts (per 5-plant random sample)					Total Pods with Beans per Plant	Average Beans per Pod
		CHU	Traits	New*	1	2	3	4		
PRIDE Genuity™ RR2Y™ Variety	5201RR2Y	3025	RR2Y, SCN	11	7	45	96	0	29.6	2.60
Competitor RR1 Variety	NK S21-N6	3000	RR1	11	5	26	67	0	19.6	2.63

The basic formula for pre-harvest estimation of soybean yields is as follows:

$$\left[\left(\text{Pod-Bearing Plants per Acre} \times \text{Pods per Plant} \right) / 60 \right] \times \left(\text{Beans per Pod} / 2.5 \right) / 1000$$

Using this calculation, assuming 150,000 pod-bearing plant population (21" Rows in this case), yield of the Roundup Ready first generation competitor is estimated at **51.5 Bushels/Acre**.

By comparison, the yield estimate of the new PRIDE FX2 Genuity™ Roundup Ready 2 Yield™ Soybean comes in at an astounding **76.7 Bushels/Acre**.

Now before we all get excited and arrange more storage, it's important to note that this calculation only becomes reliable within 3 weeks of harvest, and understandably provides more accurate estimates as we get closer to harvest. Realistically we can't expect this kind of yield. We're still 4-6 weeks from harvest, and there are many variables to this equation. Late-season diseases such as Brown Stem Rot, Sudden Death Syndrome, and White Mould will rob us of bushels. Pests such as Soybean Aphids, Spider Mites, and Japanese Beetles will have a say in final yield. Some pods counted above will abort due to cool late summer night temperatures. Most importantly, when sampling, the worst areas of the field (drowned out areas, wildlife damages, etc.) were avoided. It's also virtually impossible to generate an accurate number of pod-bearing plants per acre – it's the largest variable in the equation. The pod-counting method also does not factor in the difference in pod-bearing population between untreated Roundup Ready first generation Soybeans and Genuity™ Roundup Ready 2 Yield™ Soybeans treated with CruiserMaxx Beans. But this exercise provides us with a reliable indicator of the relative differences in yield potential between varieties and technologies.

So the big question on all our minds is: Where is this yield potential coming from? While pulling pods, we see that Genuity™ Roundup Ready 2 Yield™ Technology is providing these advantages for the plant:

- A better push for late yield, as evidenced by the branching and clustering of pods at the tops of the plants – a result of overall better plant health throughout the growing season
- More (multiple) pods at the lower nodes, developed during the cold-stress environment of late June and July
- More (multiple) pods on branches off the main stem – very apparent in wider rows (20" – 30") – an advantage of better early season plant health
- In this compare, 43% more 3-bean pods. 28% fewer 1-bean pods. Doesn't sound like much in a 5-10 plant sample, but across an acre, or a farm, it's a tremendous influence on yield
- More beans per plant

We can conclude that we're in for some good soybean yields in 2009. We can also conclude that PRIDE FX2 Soybeans, with Genuity™ Roundup Ready 2 Yield™ Technology, will provide us with the incremental increase in soybean yields we've all been looking for in recent years. We can paraphrase by saying yield is built through plant health and the plant's ability to tolerate stress. Yield accumulates throughout the growing season, and is only counted at harvest.

Check out the
Genuity™ Roundup Ready 2 Yield™ Pod Count Video by Ken Currah
at www.Fieldtalk.ca

*Soybean yield estimate calculation from "Estimating Soybean Yields Prior to Harvest" by Edward S. Oplinger, Ext. Agronomist, Depart of Agronomy, University of Wisconsin – Madison. Genuity™ and Design, Genuity Icons and Roundup Ready 2 Yield are trademarks of Monsanto Technology LLC. Roundup Ready is a registered trademark of Monsanto Technology LLC. Used under license. Cruiser Maxx is a registered trademark of Syngenta Group Company.