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Saving Roundup Ready[®] Soybean Seed

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Cornhusker Economics

Saving Roundup Ready® Soybean Seed

Market Report	Year Ago	4 Wks Ago	2/12/16
Livestock and Products.			
Weekly Average			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight.	163.12	132.00	134.00
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb.	269.97	198.24	191.35
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb.	212.01	165.76	156.56
Choice Boxed Beef, 600-750 lb. Carcass.	238.69	226.24	217.63
Western Corn Belt Base Hog Price Carcass, Negotiated.	56.51	51.55	63.60
Pork Carcass Cutout, 185 lb. Carcass 51-52% Lean.	72.05	69.65	76.30
Slaughter Lambs, woolled and shorn, 135-165 lb. National.	*	143.71	136.36
National Carcass Lamb Cutout FOB.	365.03	359.79	356.27
Crops.			
Daily Spot Prices			
Wheat, No. 1, H.W. Imperial, bu.	5.13	3.93	3.66
Corn, No. 2, Yellow Nebraska City, bu.	3.69	3.33	3.37
Soybeans, No. 1, Yellow Nebraska City, bu.	9.55	8.21	8.29
Grain Sorghum, No.2, Yellow Dorchester, cwt.	7.18	5.48	5.50
Oats, No. 2, Heavy Minneapolis, Mn, bu.	3.11	2.66	2.51
Feed			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton.	195.00	250.00	170.00
Alfalfa, Large Rounds, Good Platte Valley, ton.	75.00	82.50	82.50
Grass Hay, Large Rounds, Good Nebraska, ton.	82.50	85.00	82.50
Dried Distillers Grains, 10% Moisture Nebraska Average.	178.75	134.50	131.50
Wet Distillers Grains, 65-70% Moisture Nebraska Average.	57.50	51.50	52.00
* No Market			

Development of glyphosate resistant transgenes started in the early 1980s and was commercially introduced in soybean varieties in 1996 as Roundup Ready® (hereafter referred to as RR1) (SourceWatch, 2012). Producers perceived that the more effective, easier, and less expensive weed control associated with these varieties outweighed the economic loss from lower yields (Gurian-Sherman, 2009). In 2008, the Roundup Ready 2 Yield varieties were commercialized as Genuity® Roundup Ready 2 Yield® (hereafter referred to as RR2Y) in 2010 (SourceWatch, 2012). RR2Y soybean varieties have been rapidly replacing the RR1 varieties in the marketplace.

The U.S. government grants a patent for new inventions for 20 years after application to provide incentives for rapid development and marketing of improved technologies (Orf, 2013). The original RR1 patent expired in 2014 and the third-party patent expired in 2015, thus the RR1 transgene is available for general public use. However, many commercially released soybean varieties are protected by Plant Variety Protection (PVP), thereby limiting the potential for using RR1 transgene by producers. Seed under PVP has a “saved seed” exception that allows farmers to save enough seed to plant the next crop, but not to sell to other farmers to plant (Goeringer, 2015). Many commercial varieties are protected by a patent rather than by PVP, essentially a private company soybean breeder

can choose to protect varieties either by the federal patent law or the PVP (McEowen, 2011). Farmers can request a license to save seed from a RR1 soybean variety, and if granted, then would be able to save seed to plant in fields owned or operated by that farmer or for sale to other farmers.

Farmers presently have the opportunity to save seed from RR1 varieties from year-to-year for planting purposes with the potential to reduce seed costs and improve net income compared to the purchase of commercial seed of RR2Y varieties. This raises the question if this historical farmer practice of saving seed should be seriously reconsidered today (Mascarenhas and Busch, 2006). The issue has multiple dimensions that have to be considered including the quality and cost of saved (bin-run) seed versus commercial seed, the yield potential of RR1 and RR2Y varieties, and the meeting of legal restrictions. Given present farmer soybean seeding rates and the broad plateau for soybean plant populations producing similar yields, it is not likely that reduction in plant population due to farmer-saved-seed would account for lower soybean yield.

Materials and Methods

Research was conducted in 2012, 2013 and 2014 at the University of Nebraska Agricultural Research Development Center near Mead, NE. Unreplicated bulk plots of 29.5 feet by 220 feet were grown to produce RR1 seed to save in 2012, 2013, and 2014 for production in small-plot studies in the succeeding year. An experiment with a randomized complete block design and four replications was conducted in 14.8 feet by 49.2 feet plots with seed from three RR1 varieties and three RR2Y varieties with different maturity classifications ranging from 2.7 to 3.2. Commercial RR1 seed was used in 2012, while saved seed from unreplicated plots was used in 2013 and 2014.

Production costs were calculated for both RR1 and RR2Y production systems for each year of the three-year experiment. Seed costs were determined by contacting local agribusinesses selling soybean seed. Seed costs of RR2Y seed were estimated to be \$49.50 per unit of 140,000 seeds in 2012, 2013, and 2014. Saved RR1 seed cost in 2013 and 2014 included the grain price at harvest plus the costs of conditioning seed for planting. Herbicide, fuel, labor, and machinery costs were determined using University of Nebraska-Lincoln crop budgets (Klein et al., 2014; Klein et al.,

2013, Klein et al., 2012). Nebraska Crop Budgets identify prices specific to the crop year by surveying the industry. Machinery operation costs included labor, fuel, repairs, opportunity and depreciation costs. Land rental cost used was an average cash rent value for Eastern Nebraska (Jansen and Wilson, 2014; Johnson et al., 2013; Johnson and NewKirk, 2012).

Additional costs were incurred to save RR1 seed from fall harvest to spring planting. Seven specific cost categories were identified to save RR1 seed: seed storage equipment, interest, cleaning, quality testing, labor, cleanout, and transportation. Storage costs were associated with the use of a gravity wagon to store seed from fall to spring.

Cash grain prices came from the USDA report for a nearby delivery point (USDA, 2015). Cash soybean prices were \$14.98, \$12.51, and \$8.50 per bushel for 2012, 2013, and 2014, respectively. Gross returns were determined as the product of yield and price for the year. Net returns were calculated as the difference between gross returns and production costs. The net return was calculated for each observation (a plot), thereby allowing calculation of a standard deviation and coefficient of variation (CV) of net returns. The CV for saved RR1 and RR2Y seed represented dispersion of the net returns distribution, thus is a measure of risk associated with the two seed sources.

Results

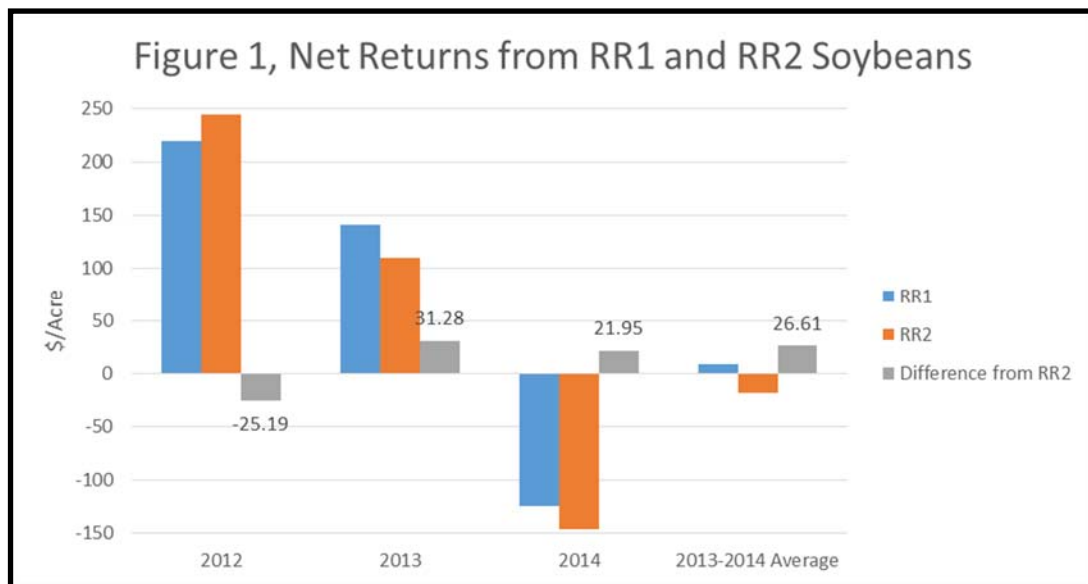
Analysis of variance indicated that no yield differences were present at $P \leq 0.05$ between RR1 seed (commercial seed in 2012, saved seed in 2013 and 2014) and commercial RR2Y seed. The lack of yield response of the RR2Y varieties was not influenced by use of commercial (2012) or saved RR1 (2013 and 2014) seed in the study, or the substitution of newer, and supposedly improved, RR2Y varieties in 2014. The study results indicate that under Western Maize Belt conditions with similar soil and environmental conditions to those in this study, saving RR1 seed for succeeding years should be a viable alternative for soybean producers in contrast to results of Dunphy and Ferguson (1991) and Conley (2009).

Saved RR1 seed cost results indicated that there were three general cost levels. The high or most expensive cost level, the saved RR1 seed, ranged

between \$15.78/acre to \$19.42/acre. The intermediate cost level which ranged between \$2.75/acre and \$3.44/acre included seed cleanout and seed storage. The low cost level, < \$0.97/acre, included seed cleaning cost, interest on money, transportation to the cleaning facility, labor, and seed testing.

Net returns for commercial RR1, saved RR1 seed, and commercial RR2Y were positive in 2012 and 2013, and negative in 2014 (Figure 1). A soybean price decline of 32% between 2013 and 2014 was the primary factor causing negative economic returns in 2014. Results for saved RR1 seed indicate a higher

net return over commercial RR2Y of \$31.28/acre in 2013 and \$21.95/acre in 2014. As a result, saved RR1 seed, on average, provided an additional \$26.61/acre in net returns over commercial RR2Y in this study. Coefficients of variation for individual plots were approximately 0.23 for saved RR1 seed and 0.32 for commercial RR2Y seed, indicating that adopting commercial RR2Y should lower net return while increasing risk under conditions similar to those in this study. Therefore, a risk-averse producer would only plant saved RR1 seed.



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