

Effect of Response of Rejuvenate on Potato Seed: Report from the NPPGA Field Day 2013

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Introduction

Understanding the relationship between physiological aged seed and stem number can help maximize profitable yield. Physiologically young seed will have fewer stems while physiologically old potato seed can cause excessive stem numbers. As the number of stems increases, so does the number of tubers per hill. This causes average tuber size to be reduced as a result of increased competition and can be less profitable. One method to mitigate this problem is to adjust within-row spacing. Another option is a newly registered product, Rejuvenate from Amvac Chemical Corporation, which reinforces apical dominance on aged seed and reduces stem number. In 2013, a research project was designed to determine the effect of Rejuvenate on potato stem number and graded yield at Inkster, ND.

What was done

A randomized complete block design was used with four replications with plots measuring 30 ft long by 4 rows wide. Rows were spaced 36 inches apart. Plots were planted on 13 June 2013 and emerged on 27 June 2013. Prior to planting, seed was cut and Rejuvenate was applied by diluting the desired rate with water in a handheld spray bottle and sprayed on seed pieces (Table 1). To more evenly distribute Rejuvenate on seed pieces, after applying Rejuvenate seed pieces were gently tossed on a plastic sheet to simulate a commercial seed treatment.

The field was irrigated with a linear sectional to maintain proper soil moisture. All other production practices were conducted according to recommended NDSU potato production practices. Stand and stem counts were completed when plants were approximately 8-10 inches tall. The two center rows from each plot were harvested on 18 October 2013 using a single row plot digger. Potatoes were graded on 4 November, 2013 in East Grand Forks, ND to determine the size distribution and yield of US #1 marketable potatoes and amount of defective potatoes (malformed tubers, severe growth cracks, knobby, etc.). Data analysis was completed using the Proc Mixed model with a Tukey pairwise separation at $P<0.10$ with SAS v. 9.3. The lack of data separation in the data may be due to field variability. For this reason it is important to have multiple sites or years to compare the data, which in turn will make a more robust statistical analysis.

Table 1. Treatments used in 2013 trial at Inkster, ND.

Treatment	Rejuvenate rate (oz/ton of seed)	Row spacing (inches)
1	0	12
2	0.16	12
3	0.30*	12
4	0.30*	10

*Not registered for use. Always read and follow the label.

Results

Stem number

As expected, the plant stand differed between the treatments. Reducing within-row spacing by two inches increased the plant stand (Figure 1). As the Rejuvenate rate increased the number of stems per plot decreased, except when the within-row spacing was reduced. Because of the greater number of plants, the number of stems per plot was similar to the untreated plot. This data indicates that reducing seed spacing by 2 inches and applying 0.30 oz/ton of seed of Rejuvenate, stem number was maintained similar to the untreated check. The average stems per plant were generally reduced when Rejuvenate treatments were applied even though the seed was relatively strong in this particular test.

Yield and size

In most cases Rejuvenate did not have a significant influence on yield (Figure 2). This is expected, as stem number tends not to influence yield, but marketable yield is influenced by stem number. Rejuvenate at 0.30 oz/ton of seed and within-row spacing of 10 inches increased the number of 6-10 oz tubers compared to the untreated check. Although not significant, there was a numerical increase in tubers >6 oz and >10 oz. Spacing reductions need not be this aggressive in future tests.

Although the response of Russet Burbank to Rejuvenate was small, it is important to remember that the untreated check averaged 3.1 stems per hill. If the average number of stems per tuber were higher, there likely would have been a greater difference when comparing the untreated check with the treated seed tubers. This phenomenon helps take the guesswork out of treatment. If the seed is physically young, you are likely to experience little to no effect and high payables. With physiological older seed and higher stem counts, the results become increasingly pronounced.

The management of weaker stems on physiologically old seed can help improve marketable yield, but also opens the door for discussion on other important topics, such as in-row spacing adjustments for increased marketable yield and reduced bruise, as well as planting dates, harvest dates and seed size.

Figure 1. Effect of Rejuvenate on stem number at Inkster, ND in 2013.

Figure 2. Graded yield of Russet Burbank as a result of Rejuvenate treatment at Inkster, ND in 2013.

Figure 3. Effect of Rejuvenate on total marketable yield and tubers > 6 and 10 oz at Inkster, ND in 2013.





